



**CADSWES** University of Colorado

Center for Advanced Decision Support for Water and Environmental Systems

# Software Development and Maintenance, Releases and Tech Transfer

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RiverWare User Group Meeting  
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# Software Development Process

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- Our goal is to deliver professional quality software applications which meet our users' needs

# Software Development Team

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- Professional software engineers
  - Continuity, institutional knowledge
  - Variety of complimentary backgrounds
- Professional water resource engineers
  - Engineering methods
  - User support
- Professional support staff
  - Software configuration management (licensing, releases)
  - Hardware maintenance

# Software Development Process

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- Requirements analysis
- Requirements document
- High level design document
- Estimates
- Other documents as appropriate
- Document reviews

# Software Development Process

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- Write code
- Unit test (may include writing test code)
- Peer code review (correctness, efficiency, coding standard conformance, readability, maintainability),
- Integration testing (including regression tests, memory analysis)

# Software Maintenance

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## ➤ Bug fixing

- Critical bugs fixed for next patch release
- Non-critical bugs deferred to next major release
- Before major release thorough review of bug list to identify bugs to fix for release

# Software Maintenance

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- RiverWare development requires many software packages:
  - Applications or libraries
  - Commercial
  - Open Source
  - Home Grown (Java, Perl, Python, Tcl/Tk)

# Software Maintenance

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- **Operating Systems:** Windows, Solaris
- **RiverWare Functionality:** Qt, Qwt, Galaxy, RogueWave, CPLEX, Concert, FlexLM, HecGen, heclib, MODFLOW, Tcl, zlib
- **Source Control, Builds, Regression Tests, Releases:** CVS, TkCVS, rw-checkout, rw-config, rw-update, rw-build, rw-rt, modelcomp, cvs-copy.pl, InstallShield, rw-release, rw-install
- **Compilers, Debuggers, Performance Analysis:** Microsoft Visual Studio, Sun Workshop, Intel Fortran, Rational Purify and Quantify
- **Bug Tracking, User Support:** Gnats, TkGnats, Perl CGI scripts, SupportTool
- **Web Pages, Online Payment System:** DreamWeaver, Photoshop, Perl and Python CGI scripts



# Software Maintenance

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- Many pieces to the puzzle, many dependencies between the pieces
- New versions of third-party software are continually released
  - Monitor and evaluate new versions
  - New versions may be compatible with RiverWare or they may require substantial RiverWare code changes
  - New versions may affect other third-party software
  - Estimate effort and schedule upgrade to new version, keeping in mind release schedule
- Keeping current requires significant effort

# User Support

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## ➤ User Support Procedure

- All user support questions should be sent to:  
`riverware-support@colorado.edu`
- Multiple support staff receive email and most appropriate or available person can respond

# Releases

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- Typically two releases each year, with additional patch releases as necessary
- Numbering
  - RiverWare Major.Minor.Patch  
where Major = major version number (currently 4)  
Minor = minor version number (currently 8)  
Patch = patch level number (currently 4)
- Downloading
  - From the web site:  
[http://cadswes.colorado.edu/users/RiverWare/download\\_steps.html](http://cadswes.colorado.edu/users/RiverWare/download_steps.html)
  - From the ftp site:  
ftp cadswes2.colorado.edu
  - For either site, log in as: rwuser
  - For passwords contact RiverWare tech support:  
riverware-support@colorado.edu

# Releases

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- Major and minor releases: RiverWare 4.8
  - Generated from latest development
  - Fully tested and verified (usually including a pre-release)
  - Include updated online documentation and release notes
  - Users notified by e-mail and encouraged to upgrade
- Patch releases: RiverWare 4.8.4
  - Generated from last full release with minor enhancements
  - Tested and verified (usually without a prerelease)
  - May include updated online documentation
    - Usually minor enhancements/fixes mentioned in email (also under “notes” link on web site)
  - Users notified by e-mail but may choose not to upgrade

# Snapshots

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## ➤ Development snapshots:

### RiverWare 4.9 Development

- Generated from previous night's development area
- Should only be used to test new development  
Should NEVER be used for operations or model building
- Only tested by overnight regression tests
- Does not include updated online documentation or notes
- Concerned users are notified by phone or email

# Bugs

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## ➤ Filing

- Should be done by users, even if RiverWare support verifies
- Should include information to reproduce the bug
  - Events leading to the bug
  - Exact text of any errors or messages
  - Model, ruleset, and/or dmi in which bug is manifested
  - Send model to [riverware-support@colorado.edu](mailto:riverware-support@colorado.edu)
  - ftp models to <ftp://cadswes2.colorado.edu/>

# Bugs

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## ➤ Follow-up

- Filer is contacted by automated email within the day
- Bug tracking system notifies filer when status changes (closed, info added, reassigned)
- Enhanced web lookup now available
- Closed bugs documented in release notes or patch e-mail

# Training Schedules

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- Typically two Intro to Simulation and two Rules classes per year
- Intro to Simulation
  - Classes held when there is enough interest / demand
  - Class dates chosen to accommodate participants' schedules
- Rulebased Simulation
  - Typically held a month or two after the Intro class
  - Need to have completed Intro to Simulation class
- Accounting Class
  - Currently under development